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PROBLEMS FOR SOLUTION.

ARITHMETIC.

114. Proposed by F. P. MATZ, M. Sc., Ph. D., Professor of Mathematics and Astronomy, Irving College, Mechanicsburg, Pa.

Does it pay a \$4-carpenter using a dozen four-penny nails per minute, to pick up a dropped nail? At this rate, should twenty-penny nails be picked up?

115. Proposed by ALOIS F. KOVARIK, Instructor in Mathematics and Physics, Decorah Institute, Decorah, Ia.

Where shall a pole 120 feet high be broken so that the top may rest on the ground 40 feet from the foot? (Solve by arithmetic.)

*** Solutions of these problems should be sent to B. F. Finkel not later than August 10.

ALGEBRA.

102. Proposed by J. MARCUS BOORMAN, Woodmere, N. Y.

Solve $2x + \sqrt{x^2 - 7} = 5$. [See *Hind's Algebra*, page 447.]

103. Proposed by WALTER H. DRANE, Graduate Student, Harvard University, Cambridge, Mass.

Given the equation $x^m + p_1 x^{m-1} + p_2 x^{m-2} + \dots + p_{m-1} x + p_m = 0$ freed from multiple roots. Prove that its discriminant is positive or negative according as the number of pairs of complex roots is even or odd.

*** Solutions of these problems should be sent to J. M. Colaw not later than August 10.

104. Prize Problem. \$2.50 for the best solution.

Compute to three decimal places each of the roots of the equation $x^2 + y = 2$, $x + y^2 = 6$.

*** Solutions of this problem should be sent to B. F. Finkel not later than September 1.

GEOMETRY.

123. Proposed by ALOIS F. KOVARIK, Instructor in Mathematics and Physics, Decorah Institute, Decorah, Ia.

A étant le point d'intersection des médianes d'un triangle ABC , démontrerque $AB^2 + BC^2 + CA^2 = 3(GA^2 + GB^2 + GC^2)$. [Ex. 84, *Géométrie*. No. 2, 1^{re} Anne L' *Éducation Mathématique*.]

*** Solutions of this problem should be sent to B. F. Finkel not later than August 10.

CALCULUS.

92. Proposed by B. F. SINE, Principal of Capon Bridge Normal School, Capon Bridge, W. Va.

How much wood is taken from a log 12 inches in diameter, by boring a two-inch hole through the center, the axis of hole being perpendicular to axis of log?